It is unfortunate that results of Colorado studies are not cited. Also, there is a difference in results as regards density of attack vs. time of felling. This should have been discussed. MMF

INTERMOUNTAIN STATION
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Research Note

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

INTERMOUNTAIN FOREST & RANGE EXPERIMENT STATION
OGDEN UTAH

No. 23 December 1955

Tps spp should have been identified fully

RELATIONSHIP BETWEEN TRAP TREE FELLING DATES AND SUBSEQUENT ENGELMANN SPRUCE BEETLE ATTACK

David McComb
Division of Forest Insect Research

McComb 1955 Res Note #23

ANNOTATION:

Spruce beetle attacks on 6" x 24" shaded samples at 1/5 tree ht intervals were least dense (2.1 - 2.4 / SQ FT) in trees felled in Sept and most dense (7.1 - 9.1 / SQ FT) in trees felled in June. Tps spp (not specifically identified) in trees was inversely proportional to spruce beetle attack density.

felled on four beetle-infested areas of Engelmann spruce:

1/ This study was made possible through the cooperation of the National Park Service, U. S. Department of the Interior, and of Region 1 of the Forest Service. The study was conducted in parts of Glacier National Park and the Kootenai National Forest, Montana.

2/ McComb, David. The use of trap trees for the control of the Engelmann spruce beetle. Master's thesis. 34 pp. Utah State Agricultural College, Logan, Utah. 1953.

Felling dates		Number of trap trees felled
September	1953	10
October	1953	17
April and May	1954	17
June	1954	12

Trees representing the average of the stand for size and vigor were selected for traps and were felled intact in shaded positions in each study area. During each felling period the traps were felled so that they were interspersed with the previously felled traps. The butt of each trap was blazed and the date of felling recorded with crayon.

During September 1954, after the beetle flight for that year had terminated, a check was made of each trap tree to determine the density of beetle attacks. The bole of each trap tree was divided into fifths longitudinally, and one sample of bark 6x24 inches was removed from a shaded area on the side of each one-fifth section. The number of Engelmann spruce beetle attacks originating under each bark sample was then counted and recorded. A record was also kept of the number of bark samples infested with Ips spp., secondary bark beetle pests (Coleoptera: Scolytidae).

RESULTS AND DISCUSSION

The average number of Engelmann spruce beetle attacks varied within each area (table 1), but in general the June-felled traps received the highest number of attacks. In the two areas where traps were felled during September the number of attacks was very low.

Table 1.--Number of Engelmann spruce beetle attacks occurring on boles of trap trees felled at different periods during the year

Plot number	Number of attacks per square foot of bole bark surface			
	September 1953	October 1953	April 1954 1/	June 1954
1	2.1 ± 0.6	4.9 ± 1.6	4.1 ± 1.0	- - -
2	2.4 ± .7	4.7 ± 1.4	6.2 ± .6	8.9 ± 1.2
3	- - -	6.8 ± 1.7	4.9 ± .8	7.1 ± 1.1
4	- - -	9.1 ± 1.4	6.7 ± 1.1	9.1 ± .7

1/ Includes four trap trees felled early in May 1954 on plot 4.

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A widespread and destructive outbreak of the Engelmann spruce beetle (Dendroctonus engelmanni Hopk.) in the northern Rocky Mountains afforded an opportunity during 1953 and 1954 to study the effectiveness of Engelmann spruce trap trees as a beetle control device.1/ These were green trees purposely felled in various locations throughout the infested spruce forests to attract beetle attacks. The attractiveness of felled trees as a beetle-breeding medium has been shown to be greater than that of living trees under comparable conditions.2/

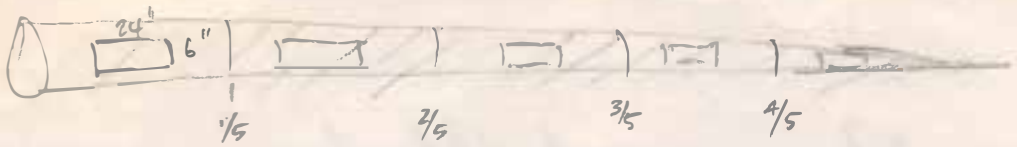
One phrase of the primary study to determine the effectivness of trap trees as a control measure was designed to show what effect variations in the felling dates of trap trees had upon their attractiveness to the attacking beetles. Engelmann spruce beetles normally attack and construct egg galleries from late May until mid-July. Trap trees may be felled any time after the end of the attack period of the previous year until the end of the attack period of the current year's beetle flight. Because of a varying labor supply and the effects of the weather on the accessibility of spruce areas it is important to know when trap trees can be felled and still perform with the greatest possible efficiency. The results of this study phase are presented here.

PROCEDURE

During the fall of 1953 and the spring of 1954, trap trees were felled on four beetle-infested areas of Engelmann spruce:

1/ This study was made possible through the cooperation of the National Park Service, U. S. Department of the Interior, and of Region 1 of the Forest Service. The study was conducted in parts of Glacier National Park and the Kootenai National Forest, Montana.

2/ McComb, David. The use of trap trees for the control of the Engelmann spruce beetle. Master's thesis. 34 pp. Utah State Agricultural College, Logan, Utah. 1953.



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3	- - -	6.8 ± 1.7	4.9 ± .8	7.1 ± 1.1
4	- - -	9.1 ± 1.4	6.7 ± 1.1	9.1 ± .7

1/ Includes four trap trees felled early in May 1954 on plot 4.

The bole bark area of trap trees felled during September 1953 was found to be largely occupied in June 1954 by developing broods of Ips beetles (table 2). Traps felled during June contained only a few scattered attacks of these beetles, and the absence of their developing broods may have accounted for the increase in the number of attacks by the Engelmann spruce beetles.

Table 2.--Percentage of trap tree bark sample surfaces infested with varying intensities of Ips spp.

Date of felling	Intensities of Ips infestations[1/]			
	Heavy	Light	Total infestation	No infestation
September 1953	44.0	22.0	66.0	34.0
October 1953	29.1	34.6	63.7	36.3
April[2/] 1954	25.4	18.2	43.6	56.4
June 1954	11.8	20.6	32.4	67.6

1/ Heavy--more than half of area occupied by Ips brood.
Light--less than half of area occupied by Ips brood.
2/ Includes four trap trees felled early in May 1954 on plot 4.

In northern Idaho, Rust[3/] found that first generation Ips oregoni (Eichh.) attacked Engelmann spruce windfalls and slash in mid-April, and that attacks of the fourth generation were taking place during September. It is possible that the spruce traps felled during September 1953 attracted Ips and that the galleries of this bark beetle made the traps less attractive to Engelmann spruce beetles the following spring by occupying parts of the cambium layer sought by the latter. The traps felled during October 1953 apparently were felled after the Ips attacks had ended for that year. Furthermore, these traps were buried under snow and were not accessible to the early spring attacks of Ips. Traps felled during April 1954 were on top of the snow and were available for early 1954 attacks by Ips before the Engelmann spruce beetle attacks started in mid-May. Traps felled during June 1954 were the most heavily attacked as they were available at a time to attract the spruce beetle yet were not down when Ips flight was at its peak.

The average number of attacks of the Engelmann spruce beetle on trap trees felled in the four test areas was determined by the month of felling (figure 1). Traps felled during June 1954 attracted nearly

3/ Rust, Henry J. Final report on the biology of Ips oregoni and associated insects of Idaho. Unpublished report, Forest Insect Laboratory, Bureau of Entomology and Plant Quarantine, Coeur d'Alene, Idaho. February 27, 1935.

four times the number of 1954 beetle attacks as did the trees felled in September 1953. Traps felled during October 1953 attracted more 1954 attacks than the trees felled in April 1954. This result would tend to rule out the theory that the drying of the traps throughout the winter decreased their attractiveness.

CONCLUSION

Spruce trap trees felled during or immediately preceding the Engelmann spruce beetle flight in late May or June appear to be preferred by the attacking beetles. Traps felled the previous September are least attractive as the cambium may be occupied by developing Ips broods. Traps felled the previous winter--October through April--while not as effective as June-felled traps, do succeed in attracting a large number of beetles.

contrary to results in colo. publ. by ~~Hat~~ Knight.

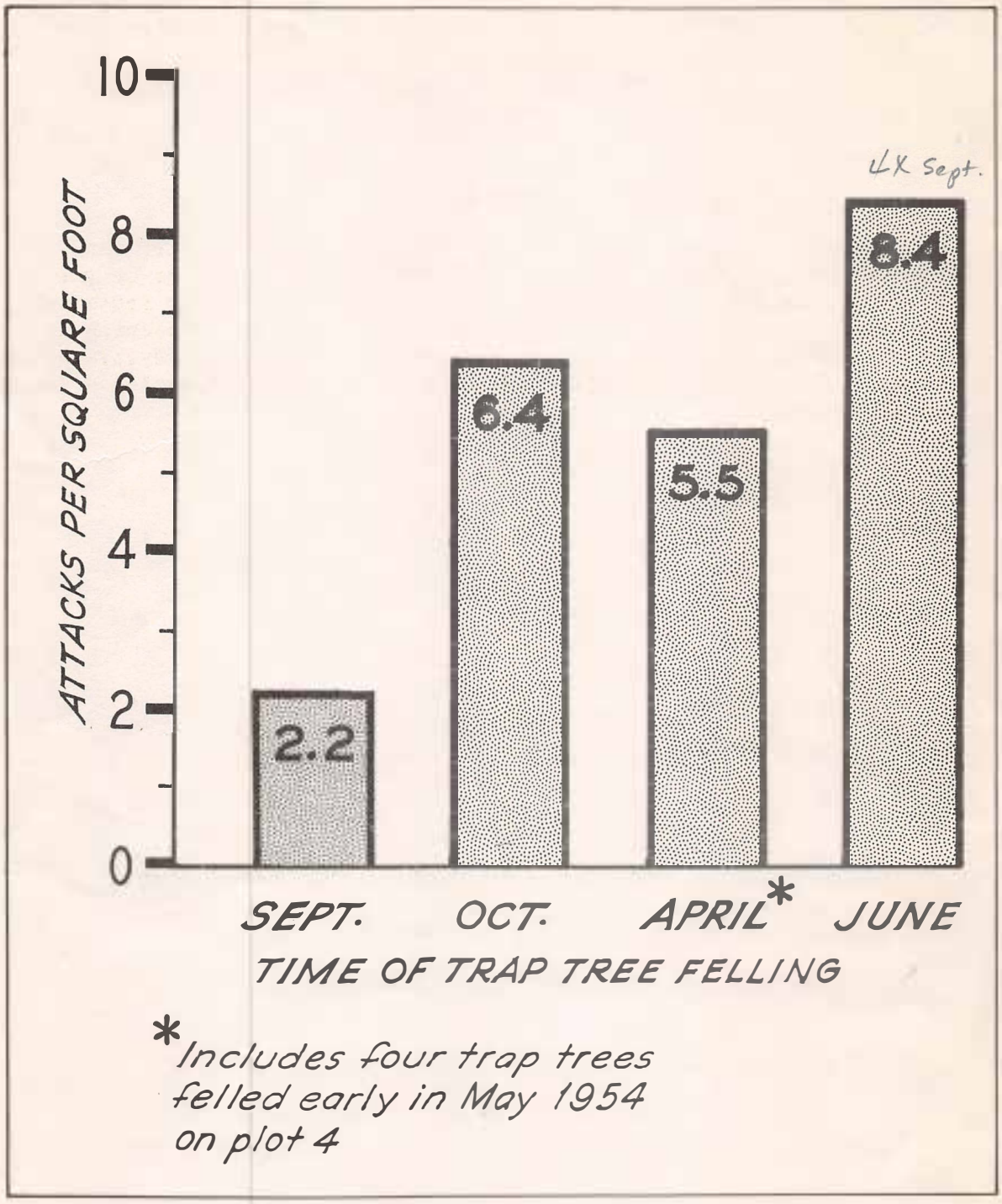

Figure 1.--Average number of attacks per square foot of trap tree bole bark surface by Engelmann spruce beetle in relation to date of felling.